**Program Overview**

**Library**
Library Main
Publications
Lending Policies
FAQs
Reference Guides

**Governor's Awards**

**Sustainable Tech Award**

**GLRPPR**

**PNEAC**

## Chromated Copper Arsenate (CCA) Treated Wood

### Introduction

Chromated copper arsenate (CCA) is used in pressure-treated wood to protect it from dry rot, fungi, molds, termites, and other pests. This wood is used in decks, wooden playground equipment, picnic tables, gazebos, bridges, and other outdoor wood products. In May 2001, the Environmental Working Group petitioned the Consumer Product Safety Commission to ban the use of CCA-treated wood in playground equipment. [Recent Developments]

This reference guide includes links to consumer information and more technical research articles which discuss the potential health and environmental impacts of CCA and arsenic, risk assessment information, and environmental cleanup alternatives. It is not intended to be an exhaustive list of resources. When articles and reports are available on the web, a link is included. For assistance locating materials not on the web or for more information, visit your local library. Some subject headings on this topic include:

- Chromated copper arsenate -- Environmental aspects
- Wood preservatives -- Environmental aspects

E-mail library@wmrc.uiuc.edu with comments or questions.

[Recent Developments] [Overview/Consumer Information] [Alternatives to CCA Wood] [Environmental Impact] [Health Effects/Toxicology] [Regulatory Action] [Remediation/Laboratory Analysis] [Risk Assessment]

### Recent Developments

**May 16, 2005:** The U.S. Consumer Product Safety Commission (CPSC) and the Environmental Protection Agency (EPA) have posted on their Web sites interim results of a two-year study of coatings (i.e., stains, sealants and paints) for chromated copper arsenate (CCA)-treated wood. This information is based on first-year results from two-year studies initiated by CPSC staff and EPA in 2003, to determine if stains, sealants and paints are effective in reducing potential arsenic exposure from existing CCA-treated structures. EPA tested the performance of 12 coatings on older wood and CPSC tested eight coatings (seven were the same as those tested by EPA) on new (as of August 2003) CCA-treated wood. [CPSC staff study of new CCA-treated wood (1st year results)][EPA study of old CCA-treated wood (1st year results)]

**March 17, 2003:** The U.S. Environmental Protection Agency granted the voluntary cancellation and use termination requests affecting virtually all residential uses of wood treated with chromated copper arsenate. These CCA products cannot be used after December 30, 2003, to treat lumber intended for most residential settings, including playstructures, decks, picnic tables, landscaping timbers, residential fencing, patios and walkways/boardwalks. Phase-out of these uses will reduce the potential exposure risk to arsenic, a known human carcinogen, thereby protecting human health, especially children's health and the environment. [Article in Environmental Protection Magazine][EPA Press Release]

**July 22, 2002:** A national environmental group today petitioned the Environmental Protection Agency to stop the disposal of billions of board feet of arsenic-treated wood with ordinary community waste and require that it be sent to hazardous waste landfills. Beyond Pesticides, a Washington-based environmental and public health group, told EPA that the waste should be treated as hazardous and disposed in lined landfills to prevent leaching of arsenic. [Press Release from Beyond Pesticides]

**February 12, 2002:** EPA Administrator Christie Whitman today announced a voluntary decision by industry to move consumer use of treated lumber products away from a variety of pressure-treated wood that contains arsenic by Dec. 31, 2003, in favor of new alternative wood preservatives. This transition affects virtually all residential uses of wood treated with chromated copper arsenate, also known as CCA, including wood used in play-structures, decks, picnic tables, landscaping timbers, residential fencing, patios and walkways/ boardwalks. By Jan. 2004, EPA will not allow CCA products for any of these residential uses. [Press Release from U.S. EPA][GreenBiz article]

### Overview/Consumer Information

### Public Interest Groups

Arsenic information (Healthy Building Network)
http://www.healthybuilding.net/arsenic/index.html

Poisoned Playgrounds
http://www.ewg.org/pub/home/reports/poisonedplaygrounds/
Original report that sparked media coverage.

National Coalition Against the Misuse of Pesticides' Wood Preservatives Page
http://www.beyondpesticides.org/WOOD/INDEX.HTM

### Reaction from Trade Groups

Zahodiakin, Phil (2001). "Wood Preservers Criticize Report on CCA". Pesticide & Toxic Chemical News, 29(33), 7.

### Media Coverage

After the Environmental Working Group released its report, there was a flurry of media coverage on the topic in local newspapers. These magazine articles are more in-depth than many of the initial stories.

Kluger, J. (2001). "Toxic Playgrounds: Forts and Castles Made of Arsenic-treated Wood Last for Years, but Should Kids Be Playing on Them?" Time, 158(2) 48-49.
http://www.time.com/time/health/article/0,8599,166864,00.html

Poison Wood: A Special Report on CCA-Treated Wood. Waste Age Magazine, August 2001.
http://www.industryclick.com/microsites/index.asp? SrID=10070&MagazineID=121&SiteID=27
Includes links to current news articles on CCA.

Lavelle, M. (2001). "Arsenic and Barbecue." U.S News and World Report, September 6, 2002.
http://www.usnews.com/usnews/issue/020916/health/16arsenic.htm
See also: "Safety on Deck" in the same issue (http://www.usnews.com/usnews/issue/020916/health/16arsenic.b.htm)

### Government Agencies & Cooperative Extension

Copper Chromated Arsenic and its Use as a Wood Preservative
http://www.epa.gov/pesticides/citizens/1file.htm

Inorganic Arsenical Pressure-Treated Wood (EPA-approved consumer information sheet)
http://www.preservedwood.com/safety/epa_ars.html

Questions and Answers What You Need to Know about Wood Pressure Treated with Chromated Copper Arsenic
http://www.epa.gov/pesticides/citizens/cca_qa.htm

Raised Beds - Is Pressure-Treated Wood Safe in Raised Beds?
http://eesc.orst.edu/agcomwebfile/garden/Gardening/ptw.html

Using Treated Wood Around the Garden
http://ace.ace.orst.edu/info/extoxnet/factsheets/mk_nl5.html

## Other Sources

Arsenic and CCA Pressure Treated Wood
http://www.origen.com/arsenic.html

How does pressure treated lumber work? What does "pressure treated" mean?
http://www.howstuffworks.com/question278.htm
Good, brief explanation of pressure treated lumber generally. Links to patent information at the end of the article that describes the pressure treatment process.

Wood Playgrounds and Picnic Tables Arsenic Danger Zones?
http://my.webmd.com/content/article/1728.80471
One of the web's best-known health information sites weighs in on the topic.

**Return to Top**

## Alternatives to CCA-Treated Wood

Manufacturers to Use New Wood Preservatives, Replacing Most Residential Uses of CCA
http://www.epa.gov/pesticides/factsheets/chemicals/cca_transition.htm

Arsenic-Free Treated Lumber
http://www.swmcb.org/EPPG/8_2.HTM

Plastic Lumber
http://www.swmcb.org/EPPG/8_1.htm

## Environmental Impact

Arsenic in Pressure Treated Wood
http://www.caes.state.ct.us/PlantScienceDay/1999PSD/arsenic99.htm

Brooks, Kenneth M. (2000). Assessment of the Environmental Effects Associated with Wooden Bridges Preserved with Creosote, Pentachlorophenol, or Chromated Copper Arsenate. Madison, WI : U.S. Department of Agriculture, Forest Service, Forest Products Laboratory. (FPL-RP-587)
http://www.fpl.fs.fed.us/documnts/fplrp/fplrp587.pdf
Abstract: Timber bridges provide an economical alternative to concrete and steel structures,

CCA-Treated Wood
http://www.ccaresearch.org/
The Florida Center for Solid Waste Management has focused some of its research efforts on the environmental impact of pressure-treated wood used in decks. Its RFP for fiscal year 2002 includes a CCA category.

Chromated Copper Arsenate (CCA) Concentrations in Leachate from Pressure-Treated Wood at a University Child Care Center
http://www.cshema.org/library/monograph62/cox.pdf

DeGroot, Rodney C. and Felton, Colin (1995). "Current and Future Options for Managing Used Preservative-Treated Wood". Paper prepared for 26th Annual Meeting, Helsingor, Denmark, 11-15 June 1995.
http://www.fpl.fs.fed.us/documnts/pdf1995/degro95b.pdf
Paper presented by researchers at the U.S. Forest Service Forest Products Laboratory. Details options for disposal of wood treated with preservatives including CCA.

Hingston JA, Collins CD, Murphy RJ, Lester JN. (2001). "Leaching of Chromated Copper Arsenate Wood Preservatives A Review". Environmental Pollution 111(1), 53-66. [Abstract: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11202715&dopt=Abstract]

Long, Cheryl (1997). "Arsenic Again Shown to Leach From Pressure Treated Wood". Organic Gardening, 44(4), 18.
Abstract: Research at the Connecticut Agricultural Experiment Station shows that decks made of chromated copper arsenate-treated wood can leach highly toxic amounts of arsenic into nearby soil. This wood should not be used in decks, garden bed frames or playground equipment.

Materials Flow Analysis of Arsenic in the United States
http://www.utexas.edu/research/ceer/dfe/project2.pdf
Paper discusses sources of arsenic in the U.S. and offers suggestions for reducing arsenic in the environment.

Metals Concentrations in Soils Below Decks Made of CAA-Treated Wood
http://www.ccaresearch.org/decks.pdf

Pressure-Treated Wood Research Reports
http://www.preservedwood.com/safety/research_list.html
A list from the American Wood Preserver's Institute, the wood preserving industry's trade group. The studies listed all downplay the environmental impact of pressure treated wood.

Research Interests of Paul Cooper, University of Toronto Department of Forestry
http://www.forestry.utoronto.ca/ac_staff/current/cooper_detail.html
Professor at the University of Toronto who is studying the environmental impact of CCA-treated wood. Page includes a list of his published journal articles.

Weis J.S. and Weis P (1995). "Effects Of Chromated Copper Arsenate (CCA) Pressure-Treated Wood In the Aquatic Environment". Ambio 269-274.

Weis, Judith S. and Peddrick Weis. 1993. "Trophic Transfer of Contaminants from Organisms Living by Chromated-Copper-Arsenate (CCA)-Treated Wood to Their Predators". Journal of Experimental Marine Biology and Ecology, 168(1):25-34.
Abstract: Oysters, Crassostrea virginica (Gmeliin), collected from a residential canal lined with wood treated with chromated copper arsenate (CCA) had elevated levels of the metals in their tissues. Snails, Thais Stramonita; haemastoma floridana (Conrad), fed the oysters gradually ate less than snails fed reference oysters, and grew less over an eight-week period. Snails that ate the canal oysters increased their body burden of copper about 4-fold over the 8 weeks, and had tissue concentrations comparable to field-collected snails gathered from a CCA bulkhead in open water. Thais specimens were not found within the canal. Juvenile fish (Leiostomus xanthurus Lacepede and Lagodon rhomboides Linn.) were fed worms (primarily Neanthes succinea Frey and Leuckart) collected from sediments adjacent to a CCA bulkhead facing open water. These worms had elevated concentrations of the metals compared to worms from a reference site. Over a 1-month period, there was a non-significant trend of

lower survival of fish fed contaminated worms compared to those fed reference worms. There was no significant difference in growth. Body burdens of these fish were not significantly elevated by this exposure, although field-collected fish from inside the canal had significantly higher concentrations of Cu and As than did the fish from the reference site.

Weis, Peddrick, Judith S. Weis and Emile Lores. 1993. "Uptake of Metals from Chromated-Copper-Arsenate (CCA)-Treated Lumber by Epibiota". Marine Pollution Bulletin 26(8):428-430. Abstract: Previous studies have shown that Cu, Cr, and As leach from chromated-copper-arsenate (CCA) pressure-treated wood and can be toxic to estuarine organisms in the laboratory. In this study, algae, barnacles, and mussles were collected from CCA-treated wood in open water and in a residential canal adjoining Santa Rosa Sound, Pensacola Beach, FL, and were analysed for the metals by inductively-coupled argon plasma emission spectroscopy. Reference organisms were collected from nearby rocks. Organisms living on the open water dock had significantly (P < than 0.05) elevated concentrations of contaminants from wood, while those living inside the canal had considerably higher concentrations. The highest concentrations in barnacles were found in those barnacles growing on new (1 year old) wood within the canal, reflecting the greater leaching of new wood.

**Return to Top**

## Health Effects/Toxicology

## Fact Sheets/General Information

Arsenic Chemical Backgrounder
http://www.crossroads.nsc.org/ChemicalTemplate.cfm? id=143&chempath=chemicals

Consumer Safety Information Sheet - Inorganic Arsenical Pressure-Treated Wood
http://www.epa.gov/pesticides/citizens/cca_consumer_safety.htm

Cox, Caroline (1991). "Chromated Copper Arsenate". Journal of Pesticide Reform, 11(1), 2-6.
http://www.pesticide.org/chromated.pdf

EDF Scorecard Chemical Profiles Arsenic
http://www.scorecard.org/chemical-profiles/ summary.tcl?edf_substance_id=7440-38-2

Integrated Risk Information System Arsenic
http://www.epa.gov/iriswebp/iris/subst/0278.htm

Public Health Statement for Arsenic
http://www.atsdr.cdc.gov/ToxProfiles/phs8802.html

ToxFAQ for Arsenic
http://www.atsdr.cdc.gov/tfacts2.html

Arsenic & CCA Wood
http://www.origen.net/arsenic.html

## Research Articles/Studies

Determining Guidelines for Metals in Children's Playgrounds in North Rhine-Westphalia

Fields, S. (2001). "Caution -- Children at Play How Dangerous is CCA?". Environmental Health Perspectives, 109(6), A262-9 [Abstract: http://ehpnet1.niehs.nih.gov/docs/2001/109-6/focus-abs.html]

Preliminary Evaluation of the Non-dietary Hazard and Exposure to Children from Contact with

Chromated Copper Arsenate (CCA)-treated Wood Playground Structures and CCA-contaminated Soil
http://www.epa.gov/scipoly/sap/2001/october/ccawood.pdf
Report from the October 23-25, 2001 meeting of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Scientific Advisory Panel on CCA-treated wood and the effects of exposure on children's health. Background documents at http://www.epa.gov/scipoly/sap/, organized by meeting date.

Toxicological Assessment. A Solid Basis for Preventive Health Care? Considerations on the Preventive Character of Guidelines for (Heavy) Metal Contamination of Children's Playgrounds

Toxicological Profile for Arsenic (September 2000)
http://www.atsdr.cdc.gov/toxprofiles/tp2.html

Transmittal of Estimate of Risk of Skin Cancer from Dislodgeable Arsenic on Pressure Treated Wood Playground Equipment

Part I: http://www.cpsc.gov/LIBRARY/FOIA/Foia00/brief/woodpla1.pdf
Part II: http://www.cpsc.gov/LIBRARY/FOIA/Foia00/brief/woodpla2.pdf

**Return to Top**

### Regulatory Action

## U.S. Environmental Protection Agency

Cancellation of Residential Uses of CCA-Treated Wood
http://www.epa.gov/pesticides/factsheets/ chemicals/residential_use_cancellation.htm

EPA Testimony on Chromated Copper Arsenate (CCA) Treated Wood
http://www.epa.gov/pesticides/factsheets/chemicals/ccatestimony1.htm

EPA Wants Arsenic Warnings on Wood
http://www.sptimes.com/News/070401/Worldandnation/ EPA%5Fwants%5Farsenic%5Fwar.shtml
Article from the St. Petersburg (FL) Times about EPA's efforts to label CCA-treated wood.

Evaluating the Wood Preservative Copper Chromated Arsenic
http://www.epa.gov/pesticides/citizens/cca_evaluating.htm

Pesticide Advisory Panel to Review Issues Pertaining to Children's Exposure to CCA-Treated Wood
http://yosemite1.epa.gov/opa/admpress.nsf/ b1ab9f485b098972852562e7004dc686/01154e6d9e2a6a1885256ad1005a7e21?OpenDocument

Public Input Sought Regarding CCA-Treated Wood Study Methods
http://yosemite1.epa.gov/opa/admpress.nsf/ b1ab9f485b098972852562e7004dc686/2ee60d657499be0885256ad1005a9354?OpenDocument

Manufacturers to Use New Wood Preservatives, Replacing Most Residential Uses of CCA
http://www.epa.gov/pesticides/citizens/cca_transition.htm

## Consumer Product Safety Commission

Comments on Protocols for (CCA) Pressure Treated Playground Equipment
http://www.cpsc.gov/LIBRARY/FOIA/FOIA02/pubcom/protocca.pdf

Petition HP 01-3 Requesting a Ban on Use of Chromated-Copper-Arsenate (CCA) Treated Wood in Playground Equipment

Federal Register Notice http://www.cpsc.gov/BUSINFO/frnotices/fr01/copper.pdf

Original Petition http://www.cpsc.gov/LIBRARY/FOIA/Foia01/petition/Arsenic.pdf

Comments on Petition
Part 1: http://www.cpsc.gov/LIBRARY/FOIA/ FOIA02/pubcom/playgrnd1.pdf
Part 2: http://www.cpsc.gov/LIBRARY/FOIA/ FOIA02/pubcom/playgrnd2.pdf
Part 3: http://www.cpsc.gov/LIBRARY/FOIA/ FOIA02/pubcom/playgrnd3.pdf

**Return to Top**

### Remediation/Laboratory Analysis

Clausen, C.A. (2000). "CCA Removal from Treated Wood Using a Dual Remediation Process." Waste Management & Research 18:485-488.
http://www.fpl.fs.fed.us/documnts/pdf2000/claus00d.pdf
Describes a remediation process for CCA-contaminated waste wood. The process removes copper, chromium and arsenic.

Evanko, C.R. and Dzombak, D.A. (1997). Remediation of Metals-Contaminated Soils and Groundwater. Pittsburgh, PA : Ground-Water Remediation Technology Analysis Center.
http://www.gwrtac.org/pdf/metals.pdf
Covers remediation of metals generally. Includes methods for arsenic, chromium, and copper.

McLean, J.; Beveridge, T.J. (2001). "Chromate Reduction by a Pseudomonad Isolated From a Site Contaminated with Chromated Copper Arsenate". Applied and Environmental Microbiology, 67(3), 1076.
Researchers describe a pseudomonad from a decommissioned wood preservation site that can reduce chromate Cr(VI) to Cr(III). The reaction can run aerobically and anaerobically and is catalyzed by an enzyme in the soluble portion of the cell.

Feasibility Study/Record of Decision - Analysis for Wood Treater Sites with Contaminated Soils, Sediments, and SludgesFeasibility Study/Record of Decision - Analysis for Wood Treater Sites with Contaminated Soils, Sediments, and Sludges (1997).

Main report http://www.epa.gov/oerrpage/superfund/resources/presump/wood/study.pdf
Appendix A http://www.epa.gov/oerrpage/superfund/resources/presump/wood/appenda.pdf
Appendix C http://www.epa.gov/oerrpage/superfund/resources/presump/wood/appendc.pdf

Evaluation of technologies considered in U.S. EPA feasibility studies and records of decision at 25 contaminated wood treater sites.

U.S. Environmental Protection Agency Office of Emergency and Remedial Response (1995). Presumptive Remedies for Soils, Sediments, and Sludges at Wood Treater Sites. (EPA 540/R-95/128)
http://www.epa.gov/oerrpage/superfund/resources/ presump/wood/wodtreat.pdf
Guidance document for remediation technologies used at abandonded wood treater sites.

U.S. Environmental Protection Agency Office of Emergency and Remedial Response (1993). Presumptive Remedies: Technology Selection Guide for Wood Treater Sites. (EPA 540/F-93/020)
http://www.epa.gov/oerrpage/superfund/resources/presump/wood/tech.pdf
Quick reference guide from the U.S. EPA. Provides an overview of remediation options at abandoned wood treatment sites.

**Return to Top**

### Risk Assessment

Ament, Lucy (2001). "Chromium Speciation Data Needed for CCA Issues, Says SAP". Pesticide & Toxic Chemical News, 30(October 29), 1. Experts reviewing the science EPA plans to use in its children's risk assessment for chromated copper arsenate could not decide last week which toxicological database the agency should use for chromium. The decision is important because Cr +6 is significantly more toxic than Cr+3, and therefore the use of Cr+6 hazard data in a risk equation could result in a much more conservative estimate.

Brooks, Kenneth M. (2000). Assessment of the Environmental Effects Associated with Wooden Bridges Preserved with Creosote, Pentachlorophenol, or Chromated Copper Arsenate. Madison, WI : U.S. Department of Agriculture, Forest Service, Forest Products Laboratory. (FPL-RP-587)
http://www.fpl.fs.fed.us/documnts/fplrp/fplrp587.pdf
This report describes the concentration of wood preservatives lost to adjacent environments and the biological response to these preservatives as environmental contaminants.Six bridges from various states were examined for risk assessment: two creosote-treated bridges, two pentachlorophenol-treated bridges, and two CCA-treated bridges.

Brooks K.M. (1996). "Evaluating the Environmental Risks Associated With the Use Of Chromated Copper Arsenate-Treated Wood Products In Aquatic Environments". Estuaries 19 (2A): 296-305.

Preliminary Evaluation of the Non-dietary Hazard and Exposure to Children from Contact with Chromated Copper Arsenate (CCA)-treated Wood Playground Structures and CCA-contaminated Soil http://www.epa.gov/scipoly/sap/2001/october/ccawood.pdf

Report from the October 23-25, 2001 meeting of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Scientific Advisory Panel on CCA-treated wood and the effects of exposure on children's health. Background documents at http://www.epa.gov/scipoly/sap/, organized by meeting date.

**Return to Top**



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